Resilience in Coastal Cities and Human Settlements

--Recommendations from International Green Model City Initiative

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"Current challenges and opportunities in ocean and coastal sustainable development"

-Celebrating 45 years of IOI and its work in Sustainable Ocean Governance-

Global Context

The world is in large scale transition to Sustainability since 2015. SUSTAINABLE DEVELOPMENT GOAL 11 commits "Make cities and human settlements inclusive, safe, resilient and sustainable."SUSTAINABLE DEVELOPMENT GOAL 13 calls for "Take urgent action to combat climate change and its impacts." SUSTAINABLE DEVELOPMENT GOAL 14 states "Conserve and sustainably use the oceans, seas and marine resources for sustainable development." These 3 goals are closely related and inseparable. Definitely, Themed as Healthy Oceans-Healthy Coast, this gathering will contribute to the integrated implementation of these SUSTAINABLE DEVELOPMENT Goals.

Vulnerable Coastal Cites and Human Settlements

Coastal zones cover 20 percent of the earth space, where more than 45 percent of population live and work. By 2025, about 75 percent of the world's population could be living within 100 km of its coast. By the end of this century, 130 million people live within one meter of sea level.

Coastal cities are heavily vulnerable to natural disaster and are affected by rising sea levels led by climate change, increased precipitation, inland floods, more frequent and stronger storms, and periods of more extreme heat and cold. Nearly 80 per cent of disasters caused by natural hazards are weather or climate related. These hazards are likely to change in frequency, intensity, geographic range and duration as a result of projected changes in climate.

Let's quote two miserable stories occurred in Asia coastal cities in the new century. The first is Indian Ocean Tsunami. In December 2004, the undersea megathrust earthquake triggered a series of devastating tsunamis along the coasts of most landmasses bordering the Indian Ocean, killing about 250,000 people in 14 countries. It was one of the deadliest natural disasters in recorded history. Indonesia was the hardest-hit country, followed by Sri Lanka, India, and Thailand.

The Second is the Fukushima Daiichi Nuclear Disaster occurred on 11 March 2011. It was the most significant nuclear incident since April 26, 1986 the Chernobyl disaster. However, an estimated 1,600 deaths are believed to have occurred due to the resultant evacuation conditions. Large areas of sea and land have been contaminated. Its adverse influence will last for many years.

Resilience

"Resilience is the capacity of individuals, communities, and ecosystems to prevent, absorb, accommodate and recover from a range of shocks and stresses which may be physical, social, or economic. A resilient system can continually survive, adapt and grow in the face of challenges and disturbances, which may be discrete and temporary, such as a natural disaster, or continue over a longer period, such as a shift in climate conditions or availability of key resources. Resilience includes both physical aspects such as infrastructure that provides protection from extreme weather events, and 'soft' aspects such as the social capital, knowledge, and financial support which can help communities respond quickly to disasters and adapt effectively to climatic changes[UNEP and The Rockefeller Foundation, Urban Environmental Sustainability and Resilience, The New Urban Agenda]".

Local governments should adopt and implement local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.

(The graphic is about Resilience characteristics)
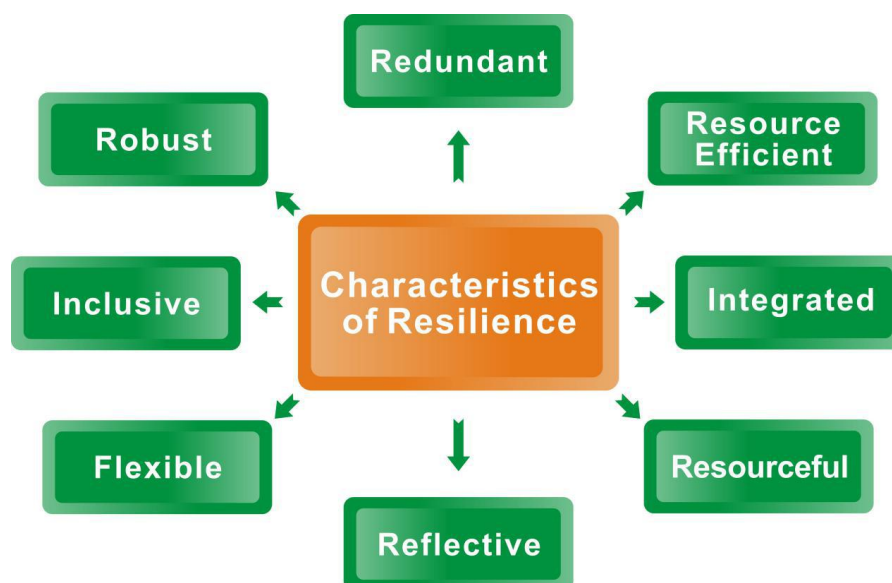
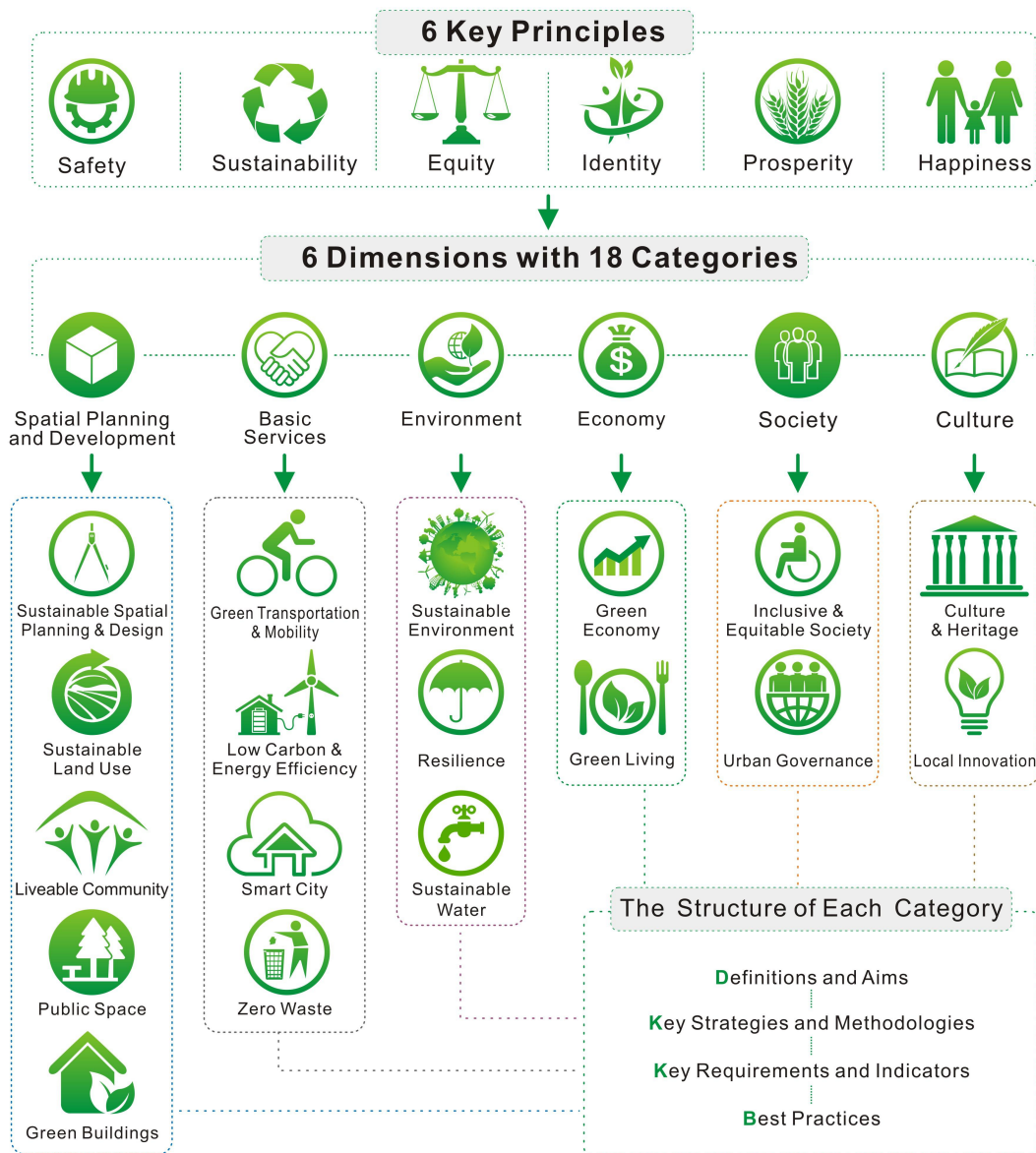**International Green Model City Initiative: Making Coastal Cities and Human Settlements Resilient**

International Green Model City (IGMC) Initiative is a greener and low-carbon city development program initiated by the Global Forum on Human Settlements (GFHS) and greatly supported by the United Nations, of which the standards are advanced tool for directing and assessing low-carbon and resilient urban planning and

development, and provide technical approaches and assessment means for the implementation of 2030 Agenda for Sustainable Development and New Urban Agenda at the city level.

The vision of the IGMC is based on the six basic principles: safety, sustainability, equity, identity, prosperity and happiness, and is implemented through the 18 categories of the six dimensions. (The Diagram is about IGMC Standards structure)

Diagram of the Structure of the International Green Model City Standards 3.0

6 Key Principles

| Safety | Sustainability | Equity | Identity | Prosperity | Happiness |

6 Dimensions with 18 Categories

| Spatial Planning and Development | Basic Services | Environment | Economy | Society | Culture |

Sustainable Spatial Planning & Design — Green Transportation & Mobility — Sustainable Environment — Green Economy — Inclusive & Equitable Society — Culture & Heritage

Sustainable Land Use — Low Carbon & Energy Efficiency — Resilience — Green Living — Urban Governance — Local Innovation

Liveable Community — Smart City — Sustainable Water

Public Space — Zero Waste

Green Buildings

The Structure of Each Category

Definitions and Aims

Key Strategies and Methodologies

Key Requirements and Indicators

Best Practices

I would like to share recommendations from IGMC initiative on how to make Cities and Human Settlements resilient, and 7 key Strategies and Methodologies are as below:

1. Building low-carbon cities to tackle climate change

The cities consume about 70% of the world's energy, of which the carbon emissions account for about 70% of the total emissions in the world. In view of this, increasing the energy efficiency, developing renewable energy and building low-carbon cities are the decisive way. A "Net Zero Carbon City" embodies the trend whereby cities attempt to systemically lower carbon emissions through energy efficient planning, design, construction, operation and maintenance with the strategic deployment of renewable energies as a primary source of electric power and attempts to achieve overall carbon neutrality[1]. Developing an over-arching Net Zero Carbon action plan and targets that are in line with IGMC principles and categories can facilitate a net carbon-neutral development by systematically addressing demand and supply issues.

2. Setting up a well-coordinated system to improve disaster prediction and emergency response. This includes: (1)reinforcing disaster prediction and forecasting, combined with the use of information and communication technologies; (2) preparing effective backup power supply, backup dringking water sources, rescure and relief supplies, special vehicles and equipments; (3)Establishing a city disaster management centre to coordinate all command and emergency management in order to take measures decisively and on a timely basis; (4) improving community self-help and mutual-help networks and capacities; (5) launching technology information exchanges and personnel training, practicing disaster drills; (6)strengthening international cooperation in disaster reduction, actively participating in global and regional disaster reduction activities.

3. Ensuring urban planning and design is adapted to natural disaster risks. This includes: (1) taking sustainable location, avoiding development in zones or sites with risks of flooding, landslides and other natural disasters; (2) adopting Sustainable Spatial Planning and Design (see Category 1.1). The compact city model and Transit-Oriented Development strategy contribute to accessibility, safety and resilience. This also includes Bioclimatic design, etc.

4. Designing Green infrastructure for resilience. Green infrastructure is

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[1]Carbon or GHG offsets may also be used as a means to reach a city-wide "Net Zero" Carbon emissions state, also known as carbon neutrality. Net Zero Carbon can refer to a current state achieved, or a future goal set by a nation, city, industry, development, facility, product, building, household or activity.

a cost-effective, resilient approach to manage wet weather impacts that reduces and treats storm water at its source while delivering environmental, social, and economic benefits. Green infrastructure uses vegetation, soils, and other elements and practices to restore some of the natural processes required to manage water and create healthier urban environments. The type of Green infrastructure includes Urban forest, Green roofs, Constructed wetlands, Permeable pavements, Rain gardens and planter boxes, Biowales, etc.

5. *Reducing flood vulnerability.* This include: (1) providing emergency dispatch system of flood prevention; (2) building a joint vision and action plan through broad consultation and engagement by relevant stakeholders, including the most vulnerable groups. （3） Unsafe slums and informal human settlements upgrading should be paid close attention to and upgraded accordingly.

6. *Improving urban infrastructure quality for resilience.* Infrastructure investments need to be reliable, and take into account future demand and potential shocks and stresses[2]. This includes: (1) Enforcing seismic and disaster design of all infrastructures and buildings to meet the requirements of the respective national standards[3]; (2) underground pipe network of urban supply and drainage system, electric power, communication etc. should be built under overall planning and with high standard; (3) adopting "Common Utility Tunnel" System, as appropriate, laying the pipes for electric power, communication, water supply, reclaimed water, etc. together in the same tunnel which otherwise embedded in separate trenches, avoiding repeated road excavation caused by embedding or maintaining pipes at different times.

7. *Building in redundancy and flexibility with spare capacity to accommodate disruption,* may mean creating distributed infrastructure networks and multiple sources for food, water and goods. Decentralized and modular approaches such as the use of small-scale renewable sources of energy can also be used to provide redundancy, as well as adaptability in case of impacts to other energy sources. Physical and spatial attributes of the landscape can enhance capacity for adaptation, for example the creation of a network of diverse spatial types, including adequate safe and usable open space as a locus for communities to recover. Creation of self-sufficient units at the local, neighbourhood, city and regional scales enhances

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[2] UNEP and The Rockefeller Foundation, *Urban Environmental Sustainability and Resilience: The New Urban Agenda.*

[3] In China, they are based on the National "Building Code for Earthquake Resistant Design".

flexibility and redundancy and therefore resilience[4].

Let me conclude: Coastal cities and human settlements are heavily vulnerable to natural disaster and are affected by rising sea levels. To make Cities and Human Settlements Resilient is an urgent challenge to humans' survival. Adopting and implementing local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, Developing low-carbon cities and improving the Resilience in line with IGMC key Strategies and Methodologies will greatly contribute to Health oceans-Healthy coast and integrated implementation of SDGs. *To live with ocean and from the ocean in a sustainable relationship* will open a new blue prosperous era for the future.

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[4] Ibid.